

PATENT ABSTRACTS OF JAPAN

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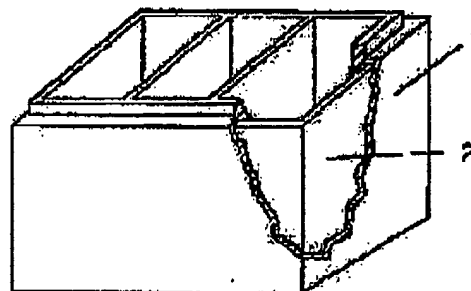
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(54) SEALED LEAD-ACID BATTERY

(57)Abstract:

PROBLEM TO BE SOLVED: To restrict the evaporation of moisture from a battery jar, and to improve the strength of the battery jar so as to improve the lifetime characteristic by integrally forming a metal plate with a peripheral wall of a battery jar, which is made of the synthetic resin and which houses an electrode group having a positive electrode, a negative electrode and a separator.

SOLUTION: A peripheral wall of a battery jar 1 made of resin is integrally formed with a metal plate 2, of which four sides are continued so as to be formed into a square, in the condition that the peripheral wall is perfectly covered with the resin. The metal plate 2 prevents the evaporation of moisture in the electrolyte from the resin battery jar 1 into the open air through the resin so as to restrain the concentration of the electrolyte, and while improves the strength of the resin battery jar 1 so as to prevent the generation of deformation or breakdown of the resin battery jar 1 due to the pressure of the electrode group to be generated by increase of the charging current. With this structure, lifetime characteristic is improved in comparison with a resin battery jar, which does not have a metal plate 2.



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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the battery case of a sealing form lead accumulator.

[0002]

[Description of the Prior Art] Along with development of a computer etc., the need for installation of the uninterruptible power supply (it is called Following UPS) as a backup power supply at the time of the interruption of service is recognized widely, and UPS tends to increase every year. Small, a light weight, and maintenance-free-ization are begun as a cell used for such UPS, and since emphasis is put on dependability including safety, the improvement to them is called for in the sealing form lead accumulator used for this UPS.

[0003] Since especially the sealing form lead accumulator is fabricated by resin and it is placed the upper part of a power circuit, and near the heating element as an installation of UPS as the configuration was shown in drawing 4 consequently, plate degradation by passing the battery case quality of the material, and the moisture in the electrolytic solution evaporating will be promoted, and a battery life will be shortened. Moreover, when using it for a long period of time, it was difficult to hold ***** uniformly depending on nonconformance with environmental temperature or a battery charger. In a cell with much plate configuration number of sheets, a battery case cannot control the force, but a crack occurs, the dilute sulfuric acid of the electrolytic solution oozes, and damage may be done to a device as an active material expands and the thickness of a plate furthermore increases while in use.

[0004] however, as shown in JP,4-155746,A, form the thermal insulation plate which laminated aluminum etc. in a battery case outer wall, or Although the rod-like structure which becomes a battery case short side face from a metal or high **** resin material was arranged in order to make battery case bulging prevent as holding reinforcement with synthetic resin and making battery case thickness increase was adopted timely and it was shown in JP,3-81951,A It had not resulted in the result to which these both are fully satisfied.

[0005]

[Problem(s) to be Solved by the Invention] For this reason, especially the sealing form lead accumulator used for UPS cannot be influenced of temperature by generating of the heat by the increment in the charging current by nonconformance with an installation or a battery charger arising, and cannot keep ***** constant in the battery case of synthetic resin that it is easy to produce deformation. Consequently, the life property might deteriorate at an early stage, and might result in breakage of a battery case.

[0006] Since it is furthermore the cell of a maintenance free, when it is used over a long period of time, the moisture in the electrolytic solution passes the battery case quality of the material, it dissipates in atmospheric air, and there is an inclination to promote life degradation further because electrolytic-solution concentration rises, and if influenced of temperature, this degradation will be promoted further.

[0007]

[Means for Solving the Problem] In order to solve this technical problem, in this invention, by really

fabricating a metal plate in the perimeter wall of the battery case made of synthetic resin which contains the group of electrode which has a positive-electrode plate, a negative-electrode plate, and a separator, evaporation of the moisture from a battery case is controlled and the reinforcement of a battery case is raised.

[0008]

[Embodiment of the Invention] This invention can be carried out in the sealing form lead accumulator which has the battery case and lid made of synthetic resin which contain the group of electrode which has a positive-electrode plate, a negative-electrode plate, and a separator like invention concerning claim 1 publication by really fabricating a metal plate and making it exist in the perimeter wall of said battery case.

[0009] And it is rare for the battery case made of synthetic resin to control evaporation of moisture by existence of a metal plate, and to deform, or for a crack to occur, and a life property is good.

[0010] In addition, in order to really fabricate a metal plate in a battery case, in case a battery case is fabricated with metal mold, without providing a special means, it can carry out easily with means, such as embedding a metal plate.

[0011]

[Example] Thermoplastic synthetic resin, such as polypropylene resin and ABS plastics, is used for this invention according to the structure of a battery case shown in drawing 1 that what is necessary is just resin in which injection molding is possible as an ingredient of the resin battery case 1. Although there is especially no limit and iron, aluminum, copper, nickel, etc. can be used as a metal plate 2 the resin of the resin battery case 1, and really fabricated, since the electrolytic solution of a lead accumulator is a dilute sulfuric acid, it must be in the condition completely covered with resin.

[0012] Moreover, although the resin of the resin battery case 1 and the thickness of the metal plate 2 really fabricated can be chosen as arbitration with the configuration of a cell, magnitude, etc., in order to synthetic resin and really fabricate, it is a premise to have the reinforcement about which the metal plate 2 with which the neighborhood of drawing 2 continued can become independent.

[0013] In order to really fabricate, it is good to arrange the metal plate 2 with which the neighborhood continued in the shape of a rectangle into battery case shaping metal mold. Drawing 3 shows the strabism cross-section structure of a metal plate 2 and the shaping metal mold 3. Next, after fastening the shaping metal mold 3, little injection of the resin is carried out from the exit hole 4 where the cross section of the reserve of right and left of a metal plate 2 is small so that rectangle-like the upper part and the lower part of a metal plate 2 may be put, and subsequently previous resin injects a lot of resin from other large exit holes 5 continuously in the condition of not individual-izing completely. In case positioning in the shaping metal mold 3 of the metal plate 2 which continued in the shape of a rectangle is performed in advance, the resin injected next is filled up with the space section 6 of the shaping metal mold 3 and the resin which carried out little injection from the exit hole 4 where the spare cross section is small fabricates the resin battery case 1 whole, it is a positioning process which arranges resin certainly on the front reverse side of a metal plate 2 and which is performed for accumulating. The battery case which arranged the metal plate 2 into the resin battery case 1 can be obtained by fabricating as mentioned above.

[0014] Hereafter, twenty-hour-rating capacity explains the property of this invention using the sealing form lead accumulator of 6.5Ah(s) by nominal-voltage 6V. However, the content volume of a cell was unified in 57 cc / cel, and the cell size was altogether unified by 28mm. The thickness of the outer wall part at the time of the part of a battery case outer wall as shown in drawing 1 as a battery case being the form which put the front flesh side with a thickness of 1.0mm with ABS plastics with a thickness of 0.5mm with the steel plate, and really fabricating used what is set to 2.0mm. As a plate, using the plate in the grid made from a lead-calcium-tin alloy, the plate dimension was 64mm in width of face of 41.5mm, and height, the positive electrode used 3.5mm, the negative electrode used 2.0mm, and, as for 2.0mm and a glass fiber separator, thickness constituted the group of electrode from three positive electrodes and four negative electrodes. After inserting a group of electrode into each cel, connection between cels was made with the conventional method, and the adhesion unification of a battery case and

the inside lid was carried out using thermosetting resin.

[0015] Next, after pouring in 15 cc of dilute sulfuric acids of specific gravity 1.235 and attaching a cap-like relief valve from the relief valve prepared in the inside lid, the top cover was carried on the relief valve, it combined with the inside lid, and joining was carried out with the supersonic wave. Charge was performed on this cell in 600mA constant current for 20 hours, and the cell was created.

[0016] The battery case outer wall constituted the cell using the battery case created as became the same as that of 2.0mm similarly, using a steel plate (0.8mm, 0.5mm, and 0.3mm) as a comparison. It fabricated only by the conventional resin which furthermore does not use a metal plate, and the cell by which a battery case outer wall is set to 2.0mm was also set and created.

[0017] Five kinds each of above six cells were created respectively, and it charged continuously in the constant voltage of 6.9V under the 60-degree C environment. In order to evaluate a battery case crack accelerative at this time, slitting with a depth of 0.3mm was put into the cell front face in the longitudinal direction. this cell -- ambient temperature discharged until the electrical potential difference fell to 5.25V according to the constant current of 1.6A every three weeks at 25 degrees C, and it measured that discharge persistence time. Time amount from which this discharge persistence time will be in 50% of an initial state was made into the life of that cell. Moreover, the thickness of the direction of a short side face of these cells was compared with the early condition.

[0018] The above result was shown in Table 1. The battery case crack was generated only in the conventional resin battery case, although it did not generate by the cell which unified the steel plate. Moreover, in 60-degree-C trickle life test result, the larger one of the thickness of a metal plate is good, and it was being reflected in the result that the welding pressure to a group of electrode was able to be held. However, it has resulted in the life in the conventional example in 4.5 months.

[0019] Furthermore, the moisture transparency to the exterior is controlled by existence of a metal plate, there is also little reduction of cell weight, and it can be surmised to a plate that the life property was good, without electrolytic-solution concentration increasing.

[0020] In addition, although explained using the steel plate, even if it uses other metal plates, it can have the same effectiveness here.

[0021]

[Table 1]

	本発明				従来
金属板の厚さ (mm)	1.0	0.8	0.5	0.3	未使用
電槽の膨らみ (mm)	0.8	1.0	1.2	1.8	3.8
電槽の割れ発生数 (個)	0	0	0	0	2
60℃トリクル寿命 (月)	6.5	5.8	5.8	5.5	4.5
電池重量の減少 (g)	5.8	6.2	6.2	5.8	12.3

[0022]

[Effect of the Invention] As explained in full detail above, when the battery case uses that by which a metal plate and resin were really fabricated with the configuration which inserts a metal plate into a battery case outer wall according to the configuration of this invention, battery case deformation or generating of a crack can be prevented, and the sealing form lead accumulator which has improved the life property can be obtained.

[Translation done.]